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**General Information****Title** Improved Print-head Integrated Fuse

**Abstract** An improved fuse design, a key element of an on-print-head programmable, read-only memory (PROM) has been incorporated onto a print-head design. Unlike previous integrated fuse designs, the new fuse design allows for fuse burning even when the fuse is covered with a barrier layer. This allows fuses to be burned after barrier application without requiring a hole in the barrier to be defined over the fuse. This in turn is expected to improve print-head reliability, as the barrier layer acts as an additional passivation to protect the fuse from ink.

**Projects** 007, 4.0, Gold Finger, GoldenEye, GoldFinger and Goldfinger

**Products** 007, Gold Finger, Golden Eye, GoldenEye, Goldeneye, Goldfinger and GoldFinger

**Description of Invention**

**Problems Solved** Previous fuses incorporated onto ink-jet print-heads as part of the thin-film stack have required a hole in the barrier layer over fuses that will be blown after the barrier layer has been applied.

Without the hole the fuses have proven very difficult to blow, thus resulting in poor yield. The hole in the barrier layer, however, increases the access of ink to the blown fuse. As the fuse burning process damages the thinfilm stack, any ink in this area can lead to an ink-short.

The new fuse design described in this disclosure does away with the requirement that holes be placed in the barrier layer over fuses that will be blown after the barrier layer has been applied. Thus, all fuses can be covered with the barrier layer, affording an extra level of protection against ink shorts.

The new fuse design can incorporate these previous solutions (barrier hole

Exhibit 1

and orifice placement) in addition to the covering the fuse with barrier, thus minimizing the probability of an ink short thru the blown fuse.

**Description** The new fuse design works by moving the fuse from a metal layer into a poly Si layer which is buried further down in the thinfilm stack. This change increases the thickness of the dielectric layers over the fuse, which is believed to allow for greater thermal diffusion of the heat generated from the fuse burn process. This in turn minimizes thermal interference from the barrier layer and has been demonstrated to allow for fuse burning with the barrier layer over the fuse.

**Advantages** The greatest advantage of the new design is that all fuses can now be covered with the thick barrier layer, offering greater protection of the blown fuse from ink.

**Invention History**

**Published** No

**Announced** Yes - 5/1/2004 - The fuses are incorporated into Goldfinger, a print-head which will be released to the market in 2004.

**Disclosed** No

**Next Three Months** No

**Described** Yes - Presentations and technical reports

**Built** Yes - 1/15/2001

**Government Contract** No

**Related Disclosure** No

**Innovation Workshop** No

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**Classification**

**Legal Techword** circuitry - components, materials, configuration, fabrication, and operation

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**Keywords** fuse**Recommended Merlin  
Responsible\_attorney**

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Administrative Record

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